Title: A VOUCHER BASED PAYMENT SYSTEM AND COMPONENTS THEREOF

Abstract: A voucher based payment system is provided for services (2, 3, 4) that are delivered by way of prepayment meters (8, 9) of the type requiring tokens to be inputted from time to time with each token being adapted to result in the supply of a limited quantity or value of the relevant service and wherein the tokens are acquired in exchange for monetary value. The tokens are of a type that can be transmitted by wireless or landline communication means. The payment system comprises a plurality of voucher vendors (11) each of which is enabled to sell to consumers vouchers that each have a predetermined or consumer selected value and a voucher identifier that uniquely identifies the voucher. The voucher identifier is also capable of wireless or landline transmission. The system includes at least one voucher processing centre (1) that is enabled to dispense to a consumer by wireless or landline transmission a token or a numeric code (as defined), or both, selectively, in exchange for a voucher identifier transmitted to it by wireless or landline transmission.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
A VOUCHER BASED PAYMENT SYSTEM AND COMPONENTS THEREOF

FIELD OF THE INVENTION

This invention relates to a voucher based payment system that is primarily aimed at providing convenience to consumers of one or more different services that are typically, but not necessarily, prepaid in amounts of money value that are often made available in a selection of predetermined values or, alternatively, may be custom selected, say by the consumer.

BACKGROUND TO THE INVENTION

Various services, in particular electricity supply services and water supply services, as well as cellular and other telephone services, are becoming more and more freely available to consumers who may not have had access to them previously. Such services are largely available on a prepaid basis but the principles of this invention will, as will be understood by those skilled in the art, apply also to the post-payment of accounts rendered in respect of such services. It is envisaged that gas supply services in appropriate regions may also be made available on a similar basis.

Electricity and water supply authorities thus provide services to many of their consumers by way of prepayment meters of an appropriate type installed at the premises of the particular consumer. In such a system a consumer purchases a separate prepaid credit token typically in the form of a numeric or alphanumeric string with a credit value encoded in it for the relevant service. The token is inputted into a particular prepayment meter the identity of which is also generally encoded in the token for security purposes and thus obtains a credit for an appropriate quantity of electricity or water, as the case may be. These tokens are usually encoded with additional information
that especially relates to the particular meter on which it is intended to be used, such as the meter serial number, and may also optionally relate to tariff information and various other parameters specific to the particular meter, consumer or delivery installation. It is therefore necessary that this additional information be available to a token generator at the time when the token is being created. This information is usually maintained on a database accessible to the token generator equipment.

Prior art systems exist that sell tokens remotely using communications services that electronically switch funds from a purchasing consumer’s bank account to the service provider’s bank account. The delivery of tokens in such systems is similarly carried out remotely by way of the communications service.

Current vending systems for electricity and water tokens require specialized and expensive equipment to be installed and maintained in remote locations, often in environmentally hostile conditions. Sophisticated infrastructure with associated levels of management skills are required to operate and maintain such systems. Many of these systems must operate off line, making it vulnerable to practices of fraudulent token generation before being detected and they require large amounts of data to be transported between systems forming part of the token vending chain, making the end-to-end delivery of tokens a costly business.

In the field of cellular telephone services, cellular network operators generally offer a pre-paid service wherein a subscriber purchases, in advance, an amount of credit value representative of a particular amount of money and that credit value is subsequently progressively consumed. Further amounts of credit value are added from time to time as and when necessary.

This credit value is typically made available for purchase in the form of a printed numeric code, which is sent back to the network operator system by
the subscriber, almost invariably by means of a cellular handset and the relevant wireless telephone service for validation including clearance that it has not been used previously. If approved, the credit value is added to the subscriber's account.

These numeric codes are often distributed by means of so-called scratch cards, on which a layer of opaque material hides the numeric code until the subscriber removes such layer after he has purchased the card in order to render the numeric code visible. Alternatively, numeric codes may be stored in electronic format in a computer and printed out at the time when a subscriber purchases credit value. In such an instance the numeric code is usually printed on a slip of paper and handed to the subscriber for processing in the manner outlined above.

The current user population of prepaid electricity, water and cellular telephone services are often in the indigent or at the least lower income group. Their financial planning and token purchase requirements are generally conducted on a "just-in-time" basis, and vending services are thus preferably available at all hours. Also, these consumers seldom operate a bank account which means that electronic transactions of the type indicated above are not possible in many instances.

Still further, in the existing structure, electricity and water supply authorities require token vendors to deposit cash takings into their bank account on a daily basis, making the vendor management a high frequency activity.

Still further, each type of token or numeric code is dedicated to one particular type of service and cannot be used for any other. Thus a payment made, say for electricity or water, cannot later be easily exchanged for a payment made for the other of the services should come to pass that are different service is required sooner than one for which a token or numeric code has already been purchased.
In order to facilitate a clear understanding of this specification, the following terms should be interpreted as having the meanings stated:-

"Prepayment meter" - a delivery meter for a service such as electricity, gas or water that must be supplied with an appropriate token ahead of the delivery of the service in order that a particular quantity or value of service may be delivered/consumed. The prepayment meter typically terminates the supply of the service once that quantity or value of service has been delivered. The term is not intended to have any inference as to whether or not a token used to activate the meter or free it for delivery of the service has been paid for in advance or has been obtained on credit.

"Token" - a numeric, alphabetic, or alphanumeric string of digits or in the alternative, electronically encoded data, that is configured to be inputted into a prepayment meter in order to enable it to supply a particular quantity or value of the service that the prepayment meter is controlling.

"Voucher identifier" - a numeric, alphabetic, or alphanumeric string of digits, or in the alternative, electronically encoded data, that in each case is configured to uniquely identify a voucher and represent a value of one or more services and wherein the voucher identifier is itself incapable of being used directly as a token but is optionally capable of being used as a numeric code.
"Numeric code" - a numeric, alphabetic, or alphanumeric string of digits, or in the alternative, electronically encoded data, that is configured to be transferred to a cellular or other mobile or landline telephone operator for clearance and subsequent crediting of a subscriber's account with the mobile or landline telephone operator with a predetermined value.

"Landline transmission" - includes transmission by way of the Internet or other landline based network.

OBJECT OF THE INVENTION

It is an object of this invention to provide a voucher based payment system and components thereof whereby one or more of the drawbacks of the existing payment systems indicated above are overcome, at least to some extent.

SUMMARY OF THE INVENTION

In accordance with this invention there is provided a payment system for services that are delivered by way of prepayment meters of the type requiring tokens to be inputted from time to time with each token being adapted to result in the supply of a limited quantity or value of the relevant service and wherein the tokens are acquired in exchange for monetary value, the tokens being of a type that can be transmitted by wireless or landline communication means, the payment system being characterised in that it is a voucher based payment system comprising a plurality of voucher vendors each of which is enabled to sell to consumers vouchers each having a predetermined or consumer selected value and wherein each of the vouchers has a voucher identifier associated therewith thereby rendering it uniquely identifiable and wherein the voucher identifier is capable of wireless or landline transmission,
and at least one voucher processing centre that is enabled to dispense a token or a numeric code or both selectively, the system being such that a voucher identifier can be transmitted by wireless or landline transmission to a remote voucher processing centre for conversion, at least in part, into a token or numeric code and the token or numeric code can be transmitted back to the consumer or the consumer’s prepayment meter by wireless or landline transmission.

Further features of the invention provide the token or numeric code to be selected from a plurality of different service token types or numeric codes associated with different services and optionally different service providers; for the voucher vendors, in a first variation of the invention, to be enabled to sell vouchers that are either pre-printed or otherwise pre-prepared in which case the vouchers typically each have one of a series of predetermined fixed monetary values and are conveniently generated by or in association with a voucher processing centre and supplied to the voucher vendor as items of commerce; for the voucher vendors in a second variation of the invention to be enabled to create voucher identifiers according to a consumer’s selection in which case a consumer selected value thereof is conveniently drawn from a bulk voucher credit value held by the particular voucher vendor; for the voucher processing centre to be enabled to validate voucher identifiers submitted to it in order to check their status and validity; for the system to be operated on a prepayment basis in which case the voucher vendors are conveniently conventional retail outlets such as supermarkets, other shops, convenience stores and automatic vending machines; and for the plurality of different services to include an electricity supply service, a gas supply service; a water supply service and a telephone service, in particular a mobile telephone service such as a cellular telephone service.

The invention also provides a computerized voucher processing centre that is configured to receive from a consumer, a voucher identifier associated with a
voucher and to redeem same by exchange for one or more service enabling
tokens or numeric codes.

The invention also provides a voucher having a voucher identifier in which
there is embodied data representative of a value that is selectively
convertible to one of at least two different types of tokens or a token in the
alternative to a numeric code.

In order that the above and other features of the invention may be more fully
understood one proposed application of the invention will now be described
with reference to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

The accompanying drawing is a block diagram illustrating a system operating
in accordance with this invention.

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWING

In this example of the invention a voucher processing centre indicated by
numeral (1) is contracted to various service providers and, in particular, in
this embodiment of the invention, one or more cellular network operators (2),
electricity supply authorities (3) and, as may be appropriate, water supply
authorities (4), to issue prepaid service enabling numeric codes and tokens
to their consumers and subscribers indicated by numeral (5). Of course, in
the event that a gas supply authority provides gas on a similar basis, such a
gas supply authority could be added to the system or could replace any one
of the other authorities.

For this purpose the voucher processing centre is contracted to purchase
batches of airtime enabling codes, preferably in electronic format, from each
of the participating network operators and these codes are stored securely in
a database (6) for later retrieval and re-sale to a consumer/subscriber. In this example of the invention each of the consumers/subscribers is illustrated as having a cellular telephone (7) as their communications means, but as will be apparent from the following, communication from a remote consumer to a voucher processing centre may be carried out in numerous other ways.

In a similar fashion the voucher processing centre is contracted with each of the electricity and water supply authorities, to generate and sell prepaid tokens to consumers that have a prepayment electricity meter (8) and/or prepayment water meter (9) installed at their premises, by means of which such utility supply authority makes available the relevant service to its consumers.

In terms of this invention, however, the voucher processing centre does not issue the airtime enabling numeric codes or supply utility tokens against direct payments, as is the present practice, but only issues them in the course of processing pre-purchased service vouchers each of which has its own unique voucher identifier. The vouchers are, in practice, purchased from a voucher vendor (11) in the form of any one of a supermarket, other shop, convenience store, any other publically accessible trading organisation or even an automatic vending machine. The service vouchers can thus be purchased, generally speaking, during ordinary trading hours or at any time by way of automatic vending machines.

The service vouchers may assume different forms. In one form, the service vouchers are typically issued in pre-defined monetary denominations and are preferably designated as being redeemable, selectively at the consumers option, for any one of a number of different services for the equivalent monetary value of the service voucher. In this case, the service is selected from cellular telephone airtime, electricity supply, and water supply. The particular service is thus not necessarily nominated at the time when the service voucher is purchased, although it may be.
In another and more advanced form, the voucher vendor may obtain a suitable secure voucher generation apparatus by arrangement with the voucher processing centre and by means of which he may generate specific service vouchers on demand, and optionally in consumer selected value, for sale to consumers. In such a system the voucher vendor would generally purchase bulk credit from the voucher processing centre and the bulk credit would be loaded onto the secure voucher generation apparatus.

A voucher identifier may typically be in the form of an alphanumeric code that is printed on the inside of a secure envelope and obscured by an obscure, typically blackened, over-layer that needs to be removed in order to expose the voucher code. Alternatively, a scratch card principle may be employed. In this way it is possible for service vouchers to be bought and sold in the same way as any other items of merchandise.

Once the service voucher identifier is exposed to the user, it becomes humanly readable and a consumer is then able to enter the code, by means of a keypad, into a suitable device such as a cellular phone or computer in order to transmit it to the voucher processing centre.

In a more advanced system, in which the voucher vendor is able to generate service vouchers using a secure voucher generation apparatus, it is possible to cryptographically sign the service voucher using a consumer unique identifier such as a meter number or a cellular phone account number or even a post-paid account number. Such a signed service voucher is rendered valueless to a third party, thus reducing the risk of theft and fraud. It is also possible that the consumer may nominate which particular service the service voucher is to be used for, in which case the voucher identifier would also be encoded with that information and would thus only be redeemable for that nominated service.
From a business perspective the voucher vendor may pre-pay for the service vouchers or bulk value according to the business relationship it has with the voucher processing centre, just as, the voucher processing centre will contract with the various service providers and cellular network operators concerned.

It is to be noted that the consumer will generally pay for the service voucher directly with cash. However, although the system is ideally suited for cash settlements, it is also possible to deal with other forms of payment methods as the case may be for various vendors.

A service voucher that has been purchased and is redeemable for any one of a plurality of different services, may then be kept by the purchaser until needed. At the time that the value of a service voucher is to be redeemed, the consumer can transmit the service voucher identifier to a remote voucher processing centre, typically, by means of an SMS message on the GSM network, or, alternatively, by any other wireless or land line communications medium such as the internet, electronic mail, interactive voice response on a telecommunication service, USSD on a GSM service, fax or even an operator voice in a call center.

It will be understood that the voucher processing centre will generally be at a remote place and that there is no need for the consumer to go anywhere near the voucher processing centre at all.

At this stage the service voucher will generally not yet be linked with a particular service and, accordingly, the consumer will also need to provide the details of the particular service he wishes to purchase and any other identification information as may be required. Alternatively, if the system were of the more advanced type indicated above, such information would already be encoded in the service voucher and the consumer would therefore only need to send the service voucher code without further specification.
At this stage, a voucher validator (10) checks that the service voucher code is valid in that it is authentic; that it has not been used before; and that it has not yet expired. According to the details of the request, it will then issue an authorization either for an airtime enabling numeric code or electricity or water enabling token from the data base (6).

It will be understood that such an airtime enabling code or electricity or water enabling token is also of a nature suitable for transmission in any of the ways indicated above and this is then sent back to the remote consumer. In the case of a cellular telephone being used, the code or token can simply be read off the display screen and inputted into, say, a keypad in the case of credit value for installation into a prepaid electricity meter or prepaid water meter. In the case of airtime for a cellular telephone the credit could, in at least some cases, be re-transmitted directly to the cellular network operator for credit to the subscribers account or in the case of a prepayment meter, directly back to the prepayment meter.

It will be understood that the system described above has numerous advantages over the existing arrangement. The service vouchers may be purchased ahead of time during normal shopping hours and then only activated on demand when required, using the voucher processing centre that could be operated on a 24-hour basis. The service voucher, being convertible into credit for any one of a number of different services, will thus assist a consumer as regards cash flow and minimise the amount of cash that needs to be invested in prepaid service vouchers.

Cash circulation between the voucher vendor and consumer remains in the normal retail channels and only the vendor settlements with the voucher processing centre need to take place and that is generally achieved in large single transactions not particularly susceptible to fraud or petty theft. The voucher vendors are managed totally at arms length and service voucher
sales to vendors are on a secure business basis, thus totally eliminating the cash risk for the service provider.

Cash-in-transit risk is removed from the service provider and remains in the domain of the voucher vendor that is part of its normal involvement, in any event.

In a more advanced system each service voucher identifier could embody a unique component making it possible to replace lost vouchers as all previously used vouchers can be recorded in the data processing centre for later reference.

Sophisticated specialized equipment and associated maintenance and management costs at the level of sales to the consumer are avoided with corresponding improvement in the total efficiency of the vending and distribution system. Similarly, sophisticated computer infrastructure requirements for token vending systems can be dramatically reduced because the vending systems need not be anywhere near the consumers and only a limited number of such systems will therefore be necessary.

There is also a reduction in the cost of data transportation between entities. There is, furthermore, a reduction in fraud opportunities and a reduction in the complexity of managing vendors and their cash takings.

A means is thus provided for a cash-based consumer population to effectively transact by electronic means without requiring a bank account.

Numerous variations may be made to the example of the invention described above without departing from the scope hereof. Most especially, the variety of services described above may be varied according to requirements and, in particular, the system of the invention may be applied to a single service, such as water or electricity. In an instance of the system operating the
supply of a single service the advantage that cash is substantially removed from the domain of the remote token or numeric code vendor and brought back into the normal retail chain system in which cash is controlled with at least enhanced security is nevertheless achieved. Thus the system of the invention may be applied to a water or electricity supply service separately from each other. It may be particularly advantageous that the system be applied to water and electricity together such that a consumer can select to redeem a voucher for either water or electricity according to immediate needs. This combination may be particularly advantageous, as these two services are very often controlled by the same supply authority, namely a municipality or the like.

Also, the data processing centre could contract with its associated service providers to collect payments against its debtors' accounts using the service voucher method. In such an application a list of debtors' accounts with balances could be given to the voucher processing centre and stored in the data base.

Alternatively, a direct online communications link would be provided between the voucher processing centre and the service provider accounting system, in which case debtors' balances would be available in real time. In such an arrangement the consumer could authorize the application of the credit to payment of a particular account using his account number in the event that it is not already encoded in the voucher code.

It will be understood that the service voucher identifiers may be simplex or complex in which case they may include other components and may have enhanced security features like being encrypted. Additional components may include items such as a voucher amount code, a unique voucher identifier code, time and date information, expiration information, service identifier code, service provider code, consumer reference code, vendor
reference code, cryptographic key codes and a cryptographic authentication signature.

The system of this invention therefore provides a means of collecting payment for one or more services by using existing cash-based retail payment channels and data communication channels already accessible to the consumer, whilst also providing a means of controlling the access to the service by using existing token mechanisms and delivery channels already accessible to the consumer in a cost efficient way. The invention thus effectively realises a remotely operated fund transfer mechanism within a cash-based system without the requirement of a bank account for the transacting consumer.

In other words, cash is converted into an electronically transferable voucher, which is subsequently, at the instance of the consumer, converted into an electronically transferable code or token, with both the voucher and code or a token being transferred to and from a remote place without any physical presence of the consumer being necessary where the voucher or token is generated.
CLAIMS:

1. A payment system for services (2, 3, 4) that are delivered by way of prepayment meters (8, 9) of the type requiring tokens to be inputted from time to time with each token being adapted to result in the supply of a limited quantity or value of the relevant service and wherein the tokens are acquired in exchange for monetary value, the tokens being of a type that can be transmitted by wireless or landline communication means, the payment system being characterised in that it is a voucher based payment system comprising a plurality of voucher vendors (11) each of which is enabled to sell to consumers vouchers each having a predetermined or consumer selected value and wherein each of the vouchers has a voucher identifier associated therewith thereby rendering it uniquely identifiable and wherein the voucher identifier is capable of wireless or landline transmission, and at least one voucher processing centre (1) that is enabled to dispense a token or a numeric code or both selectively, the system being such that a voucher identifier can be transmitted by wireless or land line transmission to a remote voucher processing centre for conversion, at least in part, into a token or numeric code and the token or numeric code can be transmitted back to the consumer or the consumer's prepayment meter by wireless or landline transmission.

2. A payment system as claimed in claim 1 in which the token or numeric code is selected from a plurality of different service token types or numeric codes associated with different services and optionally different service providers.

3. A payment system as claimed in either one of claims 1 or 2 in which the voucher vendors are enabled to sell vouchers that are either pre-printed or otherwise pre-prepared in which case the vouchers typically each have one of a series of predetermined fixed monetary values and
are generated by or in association with a voucher processing centre and supplied to the voucher vendor as items of commerce.

4. A payment system as claimed in either one of claims 1 or 2 in which the voucher vendors are enabled to create voucher identifiers according to a consumer's selection in which case a consumer selected value thereof is drawn from a bulk voucher credit value held by the particular voucher vendor.

5. A payment system as claimed in any one of the preceding claims in which the voucher processing centre is enabled to validate voucher identifiers submitted to it in order to check their status and validity.

6. A payment system as claimed in any one of the preceding claims in which the system is operated on a prepayment basis and the voucher vendors are selected from conventional retail outlets, supermarkets, other shops, convenience stores and automatic vending machines.

7. A payment system as claimed in any one of the preceding claims in which the plurality of different services includes at least one of an electricity supply service, a gas supply service, a water supply service and a mobile telephone service.

8. A computerized voucher processing centre suitable for use in a payment system as claimed in any one of claims 1 to 7 and that is configured to receive from a consumer, a voucher identifier associated with a voucher and to redeem same by exchange for one or more service enabling tokens or numeric codes.

9. A voucher suitable for use in a system as claimed in any one of claims 1 to 7 wherein the voucher has associated therewith a voucher identifier in which there is embodied data representative of a value
that is selectively convertible to one of at least two different types of tokens or a token in the alternative to a numeric code.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

| IPC  | G06F17/60 | G07F7/00 |

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

| IPC  | G06F | G07F |

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents:

- 'A' document defining the general state of the art which is not considered to be of particular relevance
- 'E' earlier document but published on or after the international filing date
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- 'A' document member of the same patent family

Date of the actual completion of the international search

31 October 2005

Date of mailing of the international search report

11/11/2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo.nl, Fax: (+31-70) 340-3016

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